2025

SPRERI
Striving for Excellence

SPRERI NEWSLETTER

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About Us

Sardar Patel Renewable Energy Research Institute (SPRERI), an autonomous organization based in Anand, Gujarat, has been at the forefront of renewable energy research, development, and commercialization since its establishment in 1979. Recognized nationally and internationally, SPRERI is known for its pioneering contributions to renewable energy technologies through fundamental research, pilot-scale demonstrations, and the commercialization of innovative solutions

Thrust Areas

The key focus areas of SPRERI include Renewable Energy, New and Alternative Energy Technologies, Energy Security, and Environmental Sustainability. SPRERI operates through four specialized divisions.

Divisions

Solar Energy

Bio-chemical Conversion

Thermo-chemical Conversion

Technology Transfer & Extension

The four divisions—Solar Energy, Bio-chemical Conversion, Thermo-chemical Conversion, and Technology Transfer—are deeply involved in research, development, demonstration, and commercialization of advanced technologies across various fields of renewable energy, environmental sustainability, and climate change. Their work encompasses hydrogen technologies, carbon mitigation, solar thermal, solar photovoltaic, water remediation, biofuels, biomass-to-electricity, and the production of valuable byproducts through energy conversion and waste bioconversion. SPRERI is also actively engaged in the development of government policies and programs, providing training, capacity building, and extension support. Additionally, it offers consultancy services, business development assistance, conducts testing, evaluation, and certification of renewable energy technologies

Legendary founders, Late Dr. H. M. Patel and Late Mr. Nanubhai Amin

The institute is recognized as scientific and industrial research organization by Department of Scientific and Industrial Research (DSIR), Bureau of Indian Standards (BIS), National Accreditation Board for Testing and Calibration Laboratories (NABL) and empaneled with Tata Institute of Social Sciences (TISS).

Vision

SPRERI aims to develop environmentally friendly renewable energy technologies that are efficient and economically sustainable for society

Mission

To excel in research, development, and the commercial deployment of renewable energy technologies, while promoting environmentally sustainable solutions through education, training, and public-private partnerships for India and other developing global economies

Board of Management

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Dr. Anil Kumar Dubey Director, SPRERI, Anand, Gujarat	Member Secretory

Research and Development

Development of a Hybrid Horizontal Flow Anaerobic Digester (HHFAD) for Enhanced Biogas Production

Horizontal Flow Anaerobic Digesters (HFAD) are an emerging technology being actively researched to enhance methane yields in biogas production systems, particularly from solid waste treatment. Unlike conventional vertical digesters, HFAD's horizontal design improves the contact between microorganisms and the solid substrate, ensuring better breakdown of organic matter. One key advantage of HFAD is that it is relatively easier to maintain thermophilic conditions, which are favorable for microbial activity. These higher temperatures speed up digestion, improve solid waste treatment efficiency, and result in higher methane production. This makes HFAD especially effective for treating waste streams with high solid content. To demonstrate these advantages, SPRERI (Sardar Patel Renewable Energy Research Institute) has designed and fabricated an HFAD specifically for biogas generation from high-solids feedstock. Initially, the reactor was operated at a total solids (TS) content of 13–14%, maintaining a hydraulic retention time (HRT) of 22 days. Throughout this period, the slurry movement and biogas release were closely monitored to optimize the process. To further enhance gas release and prevent accumulation within the slurry, a specially designed impeller was installed, which improved mixing and gas liberation. At present, the reactor operates at approximately 10% TS, with a reduced feed volume of 10 liters per day, which has extended the HRT to 35 days. Under these current conditions, the HFAD consistently produces 120–160 liters of biogas daily, showcasing its effectiveness and stable operation for sustainable energy production.

Fabricated HFAD System

Research and Development

SPRERI-TECH Biomass Torrefaction System

The rising energy demand and environmental concerns surrounding fossil fuels have prompted innovative solutions in biomass conversion. Traditional biomass faces significant industrial utilization challenges due to its low calorific value, high moisture content, and complex physical properties.

Torrefaction, a thermochemical process at 200-300 °C in oxygen-limited conditions offers an innovative solution. By removing moisture and reducing volatiles by 50-55%, torrefaction enhances biomass's calorific value by 25-27% and transforms its hygroscopic nature to hydrophobic, thereby improving energy density and storability.

SPRERI has developed a vertical-type continuous torrefaction system processing up to 20 kg/h of biomass feedstock with particle sizes up to 5 mm. The system processes diverse feedstocks like groundnut shells, cotton stalks, rice husk, mustard husk, rice straw and sawdust at optimized parameters. At optimal conditions, solid and energy yields range from 65-70% and 80-90%, respectively. The system can scale up to 200 kg/h processing, with a cost of ₹1,500-1,700 per ton, inclusive of fuel, electricity, manpower and maintenance costs. Furthermore, this torrefied fuel has the potential to be converted into pellets and briquettes for economical storage and transportation.

This technology offers a sustainable, cost-effective alternative to fossil fuels while reducing carbon footprints.

SPRERI-TECH Continuous Torrefaction System: Biomass Processing Capacity ~20 kg/h

PM-KUSUM Component-B Impact in Gujarat

A Survey Conducted in collaboration with Dakshin Gujarat Vij Company Ltd (DGVCL)

The Solar Energy Division of the Sardar Patel Renewable Energy Research Institute (SPRERI), in active collaboration with Dakshin Gujarat Vij Company Limited (DGVCL), recently undertook a detailed study titled “Impact Analysis and Performance Monitoring of Off-grid Solar Water Pumps under Component-B of the PM-KUSUM Scheme.” This initiative is a part of SPRERI’s broader efforts in supporting India’s clean energy transition and aligns directly with the Government of India’s climate action commitments and the State of Gujarat’s renewable energy goals.

This project is a significant example of how SPRERI is not just involved in lab-based research, but is also deeply engaged in field-level surveys, performance assessments, and techno-social evaluations of renewable energy systems implemented on the ground. The study focused on understanding the real-world performance, utility, and socio-economic impact of solar water pumping systems installed under the PM-KUSUM scheme across various agricultural zones in South Gujarat.

The collaboration with DGVCL not only demonstrates SPRERI’s technical and analytical strengths but also highlights its commitment to ensuring that government-led renewable energy initiatives are impactful, inclusive, and aligned with the needs of farmers and rural communities.

As India accelerates its journey towards energy independence and climate resilience, institutions like SPRERI continue to play a critical role in bridging the gap between policy and practice, ensuring that interventions are grounded in science, evidence, and community engagement.

SPRERI Team during Survey

Events

Business Workshop on: Kitchen & Mandi Waste to Watts: Technology Demonstration & Collaboration

SPRERI organized a business workshop titled “Kitchen & Mandi Waste to Watts” on 21 June 2025. The event served as a platform to showcase SPRERI’s robust biomethanation technology and promote collaboration among stakeholders. Designed as a technology demonstration and awareness initiative, it attracted a diverse audience, including industrialists, NGOs, housing societies, ashrams, gurukuls, hostels, and entrepreneurs working in biogas and sustainability sectors.

Key highlights of the event

- **Inaugural address:** Dr. A. K. Dubey highlighted SPRERI’s mission to transform lab innovations into real-world solutions through partnerships and stakeholder engagement.
- **Technical insights:** Dr. Mukund Adsul explained SPRERI’s scalable, community-oriented biogas technologies.
- **Case study:** Dr. Amrita Doshi presented the successful implementation of SPRERI’s biomethanation technology at a 3.5 TPD biogas plant.
- **Interaction session:** Participants engaged in open dialogue, discussed waste valorization, the circular economy, and future biogas projects, and some expressed interest in adopting the technology.
- **Plant visit:** Attendees toured the 3.5 TPD biogas plant, gaining hands-on experience and understanding of the technology and its operations.

The event concluded with networking, an institute tour, and feedback, reinforcing SPRERI’s mission and fostering future partnerships in sustainable energy

Glimpse of the Business Workshop

Events

MoU between SPRERI and SDAU, Palanpur, Gujarat

A Memorandum of Understanding (MoU) was formally signed between the Sardar Patel Renewable Energy Research Institute (SPRERI), Vallabh Vidyanagar and Sardarkrushinagar Dantiwada Agricultural University (SDAU), Palanpur, Gujarat on May 28, 2025. This MoU marks a significant step forward in fostering a strategic partnership between two leading institutions in the fields of renewable energy and agricultural sciences.

The primary objective of this MoU is to promote and strengthen cooperation in academic, research, training, and internship activities by leveraging the respective expertise and resources of both institutions. It aims to create a structured and sustainable platform for interdisciplinary interaction and collaboration in areas of mutual interest and benefit, particularly in the interface of agriculture and renewable energy technologies.

MoA Signing between SPRERI and SDAU

This MoU not only represents a commitment to academic and research excellence but also reinforces the mutual vision of addressing energy and environmental challenges through synergistic efforts. The collaboration is expected to result in impactful outcomes that serve the interests of academia, industry, farmers, and society at large.

Invited Lectures/Panelist/Visits

- Dr. Anil Kumar Dubey was invited as an expert in Training Program on Indian Standards for Solid Biofuels organized by BIS and the National Mission on Biomass in Thermal Power Plants (SAMARTH) on April 15, 2025
- Dr. Mr. Vinay Patel and team from National Dairy Development Board (NDDB) visited to SPRERI for the discussion on “Spoke to hub model for biochar Production” on May 19, 2025
- Dr. Mukul Dubey was honored with an invitation to Chair a technical session on Plasma Coatings, Surfaces, and Interfaces at the 4th International Online Conference on Coatings and Interfaces, USA from May 21–23, 2025
- Dr. Anil Kumar Dubey and Dr. Amrita Doshi visited NDDB, Banaskantha Biogas facility to discuss the operational issue of the plant on May 28, 2025
- Dr. Geeta Kumari and Er. Bhavin Soni visited Gujarat Energy Development Agency (GEDA), Gujarat for the discussion of “Biomass Potential Available in Gujarat” on May 28, 2025
- Solar Energy Team visited CInI, Tata Trust at Halol to understand issues with solar Pumps installed in the field on June 06, 2025
- Mr. Vinay Patel from NDDB and Dr. Sanjay Mittal from Terra Char visited SPRERI to discuss on “Spoke to hub model for biochar Production” on June 10, 2025
- Er. Asim Joshi participated in the virtual meeting of MED 04 Sectional Committee of BIS on June 13, 2025
- Dr. Geeta Kumari and Er. Bhavin Soni visited National Innovation Foundation (NIF),Gujarat on June 18 , 2025
- Er. Asim Joshi visited pump manufacturing industry M/s Rotosol, Anand for discussion on developing a solar DC to AC converter for multi-appliances on June 25, 2025
- Solar Energy Team visited M/s Sunrise LLP for a discussion on testing requirements for their big dish system on June 24, 2025
- Dr. Mukund Adsul invited by Ganpat University (Gujarat) to be the distinguished jury member to assess the innovative ideas submitted under,” Green Energy Challenge 2.0.” on June 28, 2025

Publication, Conference Presentation and Training

Publication

- Ramachandran Siddharth, Joshi Asim Kumar, Sojitra Milan, (2025). “Cooling Load Prediction of an Off-Grid Solar Under-Ground Cold Storage: A TRNSYS Perspective”; In: Dwivedi, G., Verma, P., Shende, V. (eds) Advances in Clean Energy Technologies. ICET 2023. Springer Proceedings in Energy, Springer, Singapore.

Conference/webinar presentation

- Dr. Rohit Kumar Singh attended webinar on "New emerging technologies in refinery, petrochemical & coal gasification", organized by “Lovraj Kumar Memorial Trust". Sponsored by-ONGC and HMEL, in association with Indian Institute of Chemical Engineers and Federation of Indian petroleum Industries held on 30 June 2025.

- Dr. Rohit Kumar Singh attended webinar on "Learnings from a decade of carbon capture at Boundary dam" Sponsored and organized by SHELL Catalysts & Technologies on 25 June 2025.
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Training

- Er. Bhavin Soni, Er. Akansha Pawar, Er. Drishya P. Kannan, Dr. Rohit Kumar Singh, Dr. Geeta Kumari attended a Training Programme on “SIMA Pro Software for LCA analysis organized by AICRP on Energy in Agriculture & Agro-based Industries on 24 June 2025

For more details and registration, please visit www.spreri.org

Let's work together to achieve net zero mission of country’s future!

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